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ABSTRACT

A power generating system is described which operates at high pressure and utilizes a working fluid consisting of a mixture of compressed non-flammable air components, fuel combustion products and steam. The working fluid exiting the power generating system is substantially free of NO_x and CO.

Working fluid is provided at constant pressure and temperature. Combustion air is supplied by one or more stages of compression. Fuel is injected at pressure as needed. At least about 40% of the oxygen in the compressed air is consumed when the fuel is burned. Inert liquid is injected at high pressure to produce working an inert mass of high specific heat diluent vapor for use for internal cooling of the combustion chamber.

The use of non-flammable liquid injection inhibits the formation of pollutants, increases the efficiency and available horsepower from the system, and reduces specific fuel consumption. Control systems allow the independent control of the quantity, temperature and pressure of the air, fuel and non-flammable liquid introduced in the combustion chamber allowing control of the maximum temperature and average temperature within the combustion temperature as well as the temperature of the exhaust from the combustion chamber.